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Plant breeding and seed
selection. 1898

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United States Department of Agriculture,

DIVISION OF BOTANY,

WASHINGTON, D. C.

PLANT BREEDING AND SEED SELECTION.

In connection with the cooperative tests of varieties of European and Asiatic watermelons and canteloupes now being made by the Department of Agriculture, some directions as to the proper methods of securing pure seed may be of value to growers who have not directed their attention to plant breeding and seed selection.

There is perhaps no family of plants more noted for mixing its varieties and even its species when grown in proximity than the squash family. As a result of this tendency to cross, seed growers are obliged to take extra precautions in order to keep varieties pure.

The principal and usual method is to plant different varieties in blocks remote from one another and then to remove plants and fruits not true to type. This method has, however, been improved upon and many melon-seed growers now practice hand pollination. When properly conducted this insures pure seed, a result not always certain with even the best care by the former method. Another advantage is that different varieties may, when necessary on account of limited space or scarcity of seed, be grown side by side without fear of deterioration from intermixture.

Melons and cucumbers have two kinds of flowers, male or staminate and female or pistillate, both borne upon the same plant. It is of course impossible for the female flower (fig. 1) to bear fruit unless it is fertilized with pollen from a male flower (fig. 2), either borne upon the same plant or on another plant. If the pollen comes from the flower of a plant of a variety different from that bearing the female flower the seed formed will produce plants more or less distinct from either parent and the characteristics of the variety will sooner or later disappear.

The first step in hand pollination is to cover a number of buds on the plant from which seed is desired. Equal numbers of male and female flowers should be covered, and this must be done before they

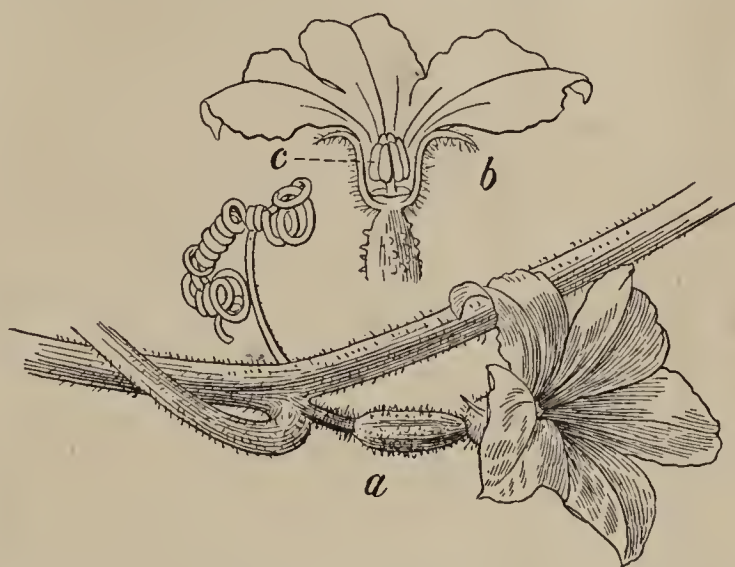


FIG. 1.—*a*, Pistillate flower of cucumber; *b*, cross-section of same showing (*c*) stigmas.

open. The object of this is to prevent the access of pollen from other plants, either through the visits of insects or the motion of the air. Small paper sacks are used for the purpose. Such sacks can be most conveniently applied when the two opposite sides are slitted halfway down with a pair of shears so that the sack may be slipped over the main stem as well as the blossom borne upon it. The sacks used must be large enough to inclose the leaf at the base of which the blossom appears, as well as the blossom itself.

As soon as the flowers inside the sacks have opened, which may be determined by examination, one of the previously covered male flow-ers should be cut from the vine, the corolla (fig. 2, *d*) removed and

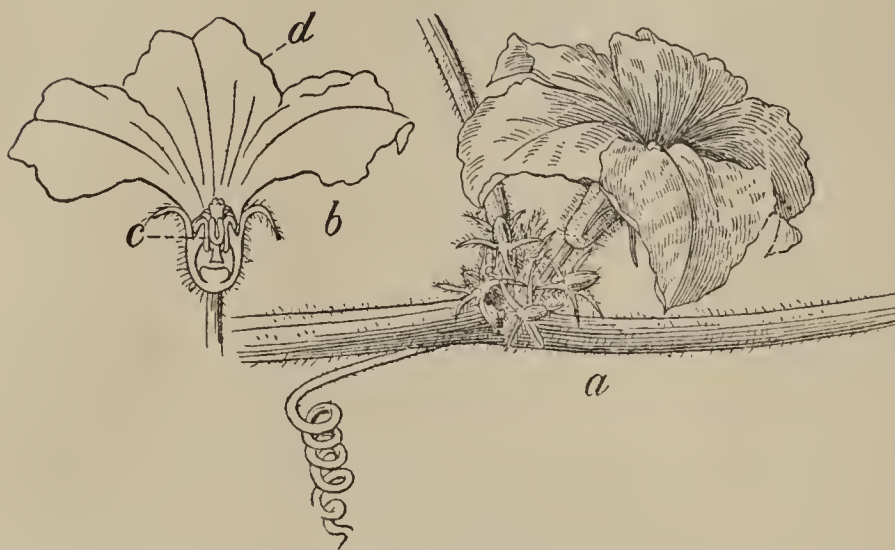


FIG. 2.—*a*, Staminate flower of cucumber; *b*, cross section of same showing (*c*) stamens and (*d*) corolla.

the anthers (fig. 2, *c*) inserted into a female flower from which the sack has been temporarily lifted; or, the pollen, if abundant, may be dusted upon the stig-mas (fig. 1, *c*). The sack should be replaced over the female flower immediately after the operation, which should be performed as

quickly as possible to prevent all chances of foreign pollen being blown into the blossom while the sack is off. All of the blossoms inclosed in the sacks may be treated in this same way.

In a few days the flower will have faded and the sack may be removed, at which time the fruit resulting from the cross should be marked with a tag so as to be readily distinguished from other fruits upon the vine. It is a good practice in seed growing to allow only a few fruits to mature on each vine, since these will be finer and their seed more valuable.

When seed is to be saved the fruit should be allowed to become fully ripe before its removal from the vine. The seed may then be taken out, and should be washed, dried, and carefully labeled before being stored.

The Department respectfully requests notification of the quantity of seed thus obtained and what proportion the owner is willing to place at the disposal of the Department for distribution.

FREDERICK V. COVILLE,

WASHINGTON, June 22, 1898.

Botanist.



